NOISE ELEMENT OF THE GENERAL PLAN

FOR THE

CITY OF INDUSTRY

SEPTEMBER 12, 1974

Prepared by

NATIONAL ENGINEERING COMPANY

NOISE ELEMENT

CITY OF INDUSTRY

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NOISE ELEMENT

I. Environmental Setting

The City of Industry is edged by freeways. The San Gabriel River Freeway to the west and the Pomona Freeway to the south bound the City directly while the San Bernardino Freeway and the Orange Freeway skirt the City on the north and east respectively. The Union Pacific Railroad and the Southern Pacific Railroad both extend the 15 mile length of the City within its boundaries. The Southern Pacific also has a switch yard located in the central section of the City just east of Hacienda Boulevard.

These transportation routes are generators of sound. The high ambient noise level associated with railroads and freeways often determines adjacent land usage. The founders of the City of Industry realized that the land surrounding these noise generators was more suited to industrial or commercial uses than for residential usage. The City of Industry was formed as this fact became apparent. Most land within the City is zoned industrial with the remainder being zone commercial. By this zoning, compatible land usage is assured.

The predominant source of noise within the City of Industry is the aforementioned transportation facilities. Trucks, motorcycles and automobiles with faulty exhaust systems are the primary offenders. Freeway traffic is the greatest contributor to the noise level because of the frequency of occurrence of intrusive noise generators. The two railroad lines crossing the City are secondary to the freeways in generating noise. Fixed point noise sources within the City of Industry constitute a very minor portion of the total noise environment.

Since the City is predominantly industrial, very few residential and commercial areas are exposed to transportation noise. The residences within the City are remaining from the time when the City was still an agricultural area. These residences are at variance with City Zoning and are either zoned commercial or industrial-agricultural. Only commercial enterprises complimentary to the industrial employment base are permitted within the City. Objectionable noise has not been experienced in these commercial zones. Manufacturing plants which by nature are the principle source of fixed point noise in the City are generally segregated from the commercial developments. The noise from transportation facilities overshadows other noise sources within the City.

II. Jurisdictional Authority

Increasing concern over the noise environment has prompted governmental authorities to pass laws whereby jurisdictional control of transportation related noise is transferred from local to state and federal agencies. The following summary presented by the Southern California Association of Governments (SCAG) details the current responsibilties of local, state and federal jurisdictions.

Summary Analysis of Jurisdictional Responsibility in Noise Control

A. Federal

1. Aircraft: NCA 1972, EPA to propose noise control regulations for aircraft, amends S 611 FAA Act of 1958, asserts that FAA and EPA pre-empt local control (U.S.C. 1973).

2. Motor Vehicle:

   a. Federal Aid Highways Act, P.L. 91-605 directs Secretary of Transportation to make standards for highway noise control; promulgated in PPM 90-2 of February, 1973.

   b. NCA 1972, regulates noise from surface carriers and motor vehicles engaged in interstate commerce.

3. Noise in General:

   a. Walsh Healy Act applies noise standards to Fed. contracts.

   b. O.S.H.A. applies noise standards to businesses affecting interstate commerce.

   c. NCA 1972 gives EPA authority to prescribe standards for new products:

      1. construction equipment

      2. transportation equipment

      3. any motor or engine

      4. electric/electronic equipment also label noise emitting or noise abating equipment.

B. State (California)

1. Aircraft: Subchapter 6. Noise standards, Department of Aeronautics. Regulate noise for all aircraft operations to extent not already limited by federal law.

2. Motor Vehicle:

a. Motor Vehicle Code regulates noise limits for new vehicles and all motor vehicle operation.

b. Cal. Streets and Highways Code S 216 regulates noise within schools near freeways.

c. Harbor and Navigation Code S2:654.05 regulates noise emission from motorboats in or upon inland waters.

3. Noise in General:

a. Division of Industrial Safety publishes noise regulations.

b. S 415 Penal Code prohibits loud and unusual noise that disturbs the peace.

c. Environmental Quality Act encourages local agencies to control environmental quality.

C. Local

1. Aircraft: Airport authority as proprietor may impose curfew. (Issue has yet to be resolved in courts.)

2. Motor Vehicle:

a. Local jurisdiction may enact regulations for off-highway motor vehicles, refuse vehicles and sound trucks.

b. May regulate the use of roads and highways based on noise considerations.

3. Noise in General:

a. May enact ordinances to control:

1. construction noise

2. amplified sound

3. fixed noise sources

4. other noise sources whose control is not pre-empted by state or federal government.

5. loud/unusual noise.

III. METHOD AND FINDINGS

The California Government Code Section 65302 (g) requires all city and county general plans to include a noise element in quantitative numerical terms, showing contours of present noise levels for existing and projected noise levels for proposed major transportation systems. For the preparation of noise elements the State of California specifically recommends the use of the A weighting network. The A weighting network most closely resembles the way that the human ear perceives sound, that is, low frequency and high frequency sounds are not as heavily weighted as the mid-range sounds which the human ear hears most clearly. From an evaluation of A weighted scales (with correction for time duration and time of occurrence of events) by Wyle Laboratories, the City of Industry chose the Ldn scale.

The Ldn reading is a time weighted value based on time of occurrence of the event. The weighting is as follows:

For events from 7:00 A.M. to 10:00 P.M. Weighting = 1.0

For events from 10:00 P.M. to 7:00 A.M. Weighting = 10.0

For the City of Industry, noise level data for transportation sources was presented by the Los Angeles County Road Department after assimilation from local traffic studies, Caltrans, and the railroad lines.

Figure (1) shows the noise contours in 5 decibel increments for the City of Industry down to 65 dBA in most areas and down to 55 dBA in the recreational area and 60 dBA near the health center. These contours are based on Ldn values. It may be assumed that this noise level will be exceeded approximately 10% of the time. The peak noise levels shown are based on California Test Method 701-A. The percentage of the time that this peak noise level will be experienced will be equal to half of the % trucks shown for that highway. The maximum level is generated by a diesel truck in the lane nearest to the observer. (See map pocket)

Figure (2) shows the location of readings taken by staff during preparation of this element. Ambient and peak noise levels at these locations are presented in Appendix 1. The ambient reading is generally below the contour value and the peak reading exceeds the contour

is would be expected. These readings were made at random locations and times in order to cover the entire city.

Railroad lines, freeways, and highways are the transportation noise sources already described. There are two heliports that serve this area as well. One is the heliport of the Los Angeles County Sheriff substation in the City of Industry. The other heliport is a private facility owned by Paddock Engineering, located within the City and surrounded by the City. The use of these facilities is infrequent and does not warrant altering the general contour trend. Paddock's facility is in the noise contours generated by Valley Boulevard and the Southern Pacific Railroad. The Sheriff Station heliport is within the contours generated by Azusa Boulevard crossing the Southern Pacific Railroad. Neither source contributes frequently or loudly enough to cause contour displacement.

To put these contours into perspective, the following chart of typical everyday noise and the dBA level for each is presented.

B. ACOUSTICAL SCALE

	dBA	
	-180-	
	-145-	
Pain	-140-	
Sonic Boom	-135-	
	-130-	
Jet Takeoff at 200'	-125-	
	-120-	
	-115-	Discotheque
Motorcycle at 20'	-110-	
	-105-	Power Mower
Discomfort	-100-	
Subway Train at 20'	- 95-	Newspaper Press
Freight Train at 50'	- 90-	Food Blender
Propeller Plane Fly-Over at 1,000'	- 85-	Electric Mixer
Freeway Traffic at 50'	- 80-	Washing Machine; Alarm Clock; Garbage Disposal & Electric Can Opener.
Office with Tabulating Machines	- 75-	
Average Traffic at 100'	- 70-	Vacuum Cleaner; Portable Fan
	- 65-	Electric Typewriter at 10'
	- 60-	Dishwasher Rinse at 10'; Air Conditioning Unit
	- 55-	
	- 50-	Normal Conversation at 12'
Light Traffic at 100'	- 45-	Refrigerator
	- 40-	
	- 35-	Library
	- 30-	
	- 25-	
	- 20-	Motion Picture Studio
	- 15-	
	- 10-	Leaves Rustling
	- 5-	
Threshold of Hearing	- 0-	

C. Special Areas

Recreational areas, schools, and hospitals are zones that are historically sensitive to noise. The City of Industry has three (3) schools, two (2) recreational areas, and one (1) health care facility.

In the western part of the City is California Country Club, a private recreational area and golf course which provides 200 ± acres of open space. The San Gabriel River Freeway passes through the club property and is the primary noise source in this region. The adjacent lands are either in agricultural use, vacant or perpetually open space such as the San Gabriel River. Trees abound on both the golf course and along the freeway. Club management has indicated that no adverse noise problem exists at this time.

The proposed regional park, located in the northern central section of the City, is the other recreation area. This area is separated from the industrial areas of the City and is also isolated from the transportational noise sources by the City of La Puente. Directly north of this recreational area is Workman High School. The hills of the park shield the school from all noise generated to the south. Utilization of these hills as park land will preserve the quiet that now exists.

Loren Junior High School, in the northwest portion of the City, is bounded by unincorporated residential areas on the north and east. The small industrial sites to the south and west are not a problem.

The other educational facility within the City of Industry is the La Puente Valley Adult School. Located in the central section of the City at 15359 Proctor, opposite the El Encanto Convalescent Center which is the only health facility within the City. The director of the school said that the only problems with noise were internally generated and were a result of the construction of the building housing the school and the activities therein.

The Convalescent Center is located in the western section of a 40 acre tract. The site is bounded on the north and east sides by city owned property containing historical landmarks. The houses of the pioneer Temple and Workman families and the cemetary where Pio Pico, the last Mexican Governor of California is interred, are part of this area. The south edge of the property is the San Jose Creek Channel. The director of El Encanto indicated that with industrial buildings buffering the noise sources and the use of completely air conditioned buildings for the convalescents, noise has not been a problem.

IV. GOALS

The City of Industry has two sets of goals regarding noise. The immediate goals are: 1. to maintain a low profile of noise sources so that surrounding communities are not infringed by noises from sources other than transportational (State and Federal authorities have pre-empted the control of noise emanating from transportational sources from local jurisdiction). 2. to continue proper land use by locating industries generating noises that might be objectionable in compatible areas.

The long range goals of the City of Industry are: 1. to limit transportation noise to a level that does not jeopardize health and welfare; 2. to minimize noise levels of future transportation facilities; 3. to protect areas that are presently quiet from future noise impact; 4. to limit the noise emitted from fixed point noise sources as the noise from transportational sources is reduced in conjunction with federal programs.

V. Policy Implementation

A. Short Range Recommendations

1. Encourage federal and state governments to set reasonable and effective noise limits for all transportation vehicles.

2. Establish acceptable noise levels to be used in the specifications for purchase of vehicles, aircraft and their components, and equipment.

3. Conduct a continuing community noise study to determine the noise levels of non-transportation sources.

4. Encourage assessment of the costs of noise abatement against the producers of noise.

5. Encourage standardization of noise measurement methods.

B. Medium and Long Range Recommendations

1. Continue to update the noise element, community noise study, building code, and subdivision and zoning ordinances as needed.

2. Maintain liaison with transportation agencies regarding noise emanating from existing and proposed facilities.

3. Study the noise ordinance proposed by the League of California Cities to determine applicability to the City of Industry.

VI. TECHNICAL APPENDIX

CONTENTS

A. DEFINITIONS

Sound: That which may be heard.

Noise: Sound which is unpleasant.

Decibel: Unit of measuring sound. A logarithmic scale, based on the intensity of the sound. Symbol - dB.

A-Weighted: A weighting system where the high and low frequencies are descriminated against much as the human ear does when listening to a full spectrum of sounds simultaneously. Noise measured using this system is expressed in decibels usually written dBA.

Statistical A-Weighted Noise Level: A system wherein a value is expressed in dBA which is a value exceeded by surrounding noises a certain percentage of the time. For instance, a value symbolized L10 is a noise reading that will be exceeded only 10% of the time. Similarly, L99, L90, L50, L1 denote the value of the noise level exceeded 99, 90, 50 and 1 per cent of the time respectively.

Equivalent Noise Level, Leq: Leq is an average noise level based on the average content of the sound. This contrasts the sound pressure level generally used in dBA. Due to the logarithmic nature of the decibel this "energy mean" level differs from an arithmetic mean of sound pressure levels.

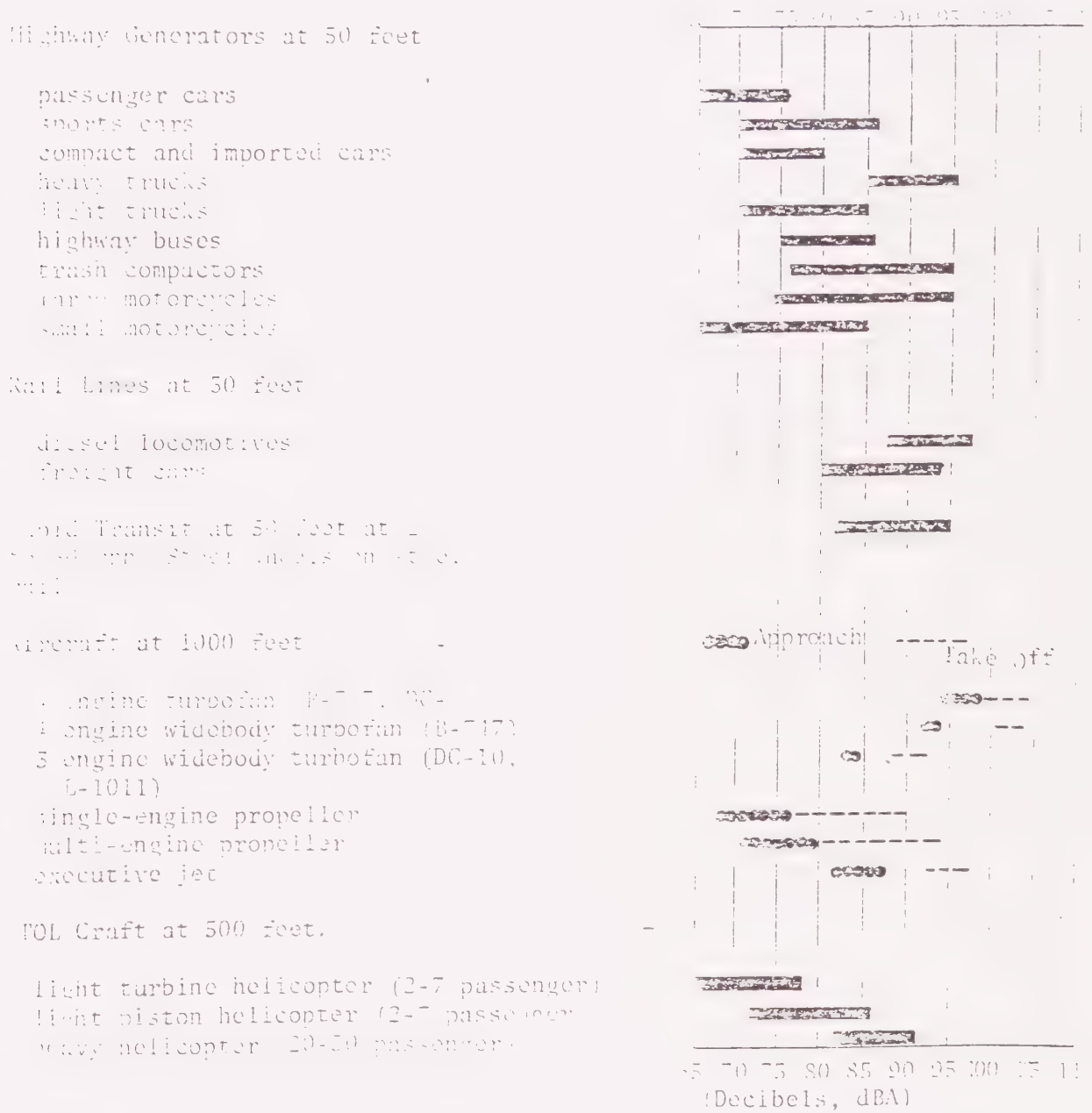
Community Noise Equivalent Level, CNEL: Is based on a weighted summation of hourly Leq's over a twenty four hour period. From 7:00 A.M. to 7:00 P.M. weighting factor = 1.0, from 7:00 P.M. to 10:00 P.M. weighting factor = 3.0, from 10:00 P.M. to 7:00 A.M. the weighting factor equals 10.0. Thus the time of occurrence of noise events is accounted for.

Day-Night Average Sound Level, Ldn: Is the logical simplification of the CNEL system. The system is again a weighted summation. The daytime factor of 1.0 applies from 7:00 A.M. to 10:00 P.M. The night factor is 10.0 and is used from 10:00 P.M. to 7:00 A.M. A weighting factor of 10.0 for night time events indicates that the event is considered to be 10 times as significant as a daytime event.

California 701-A Test Method: Presents maximum noise levels to which sites along highways may be exposed. Not possible to correlate these values with values of Ldn or L10 since neither the time of occurrence or the number of such peak events is known.

B. NOISE EMISSION LEVELS FROM TRANSPORTATION VEHICLES

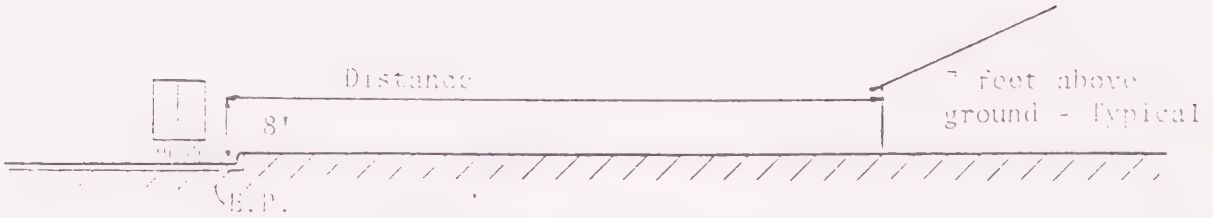
Table 2 shows typical noise ranges for various types of transportation vehicles presented by Wyle Laboratories. The City of Industry has no airports and no fixed rail rapid transit systems.



Present noise emission levels for transportation vehicles.

TABLE 2

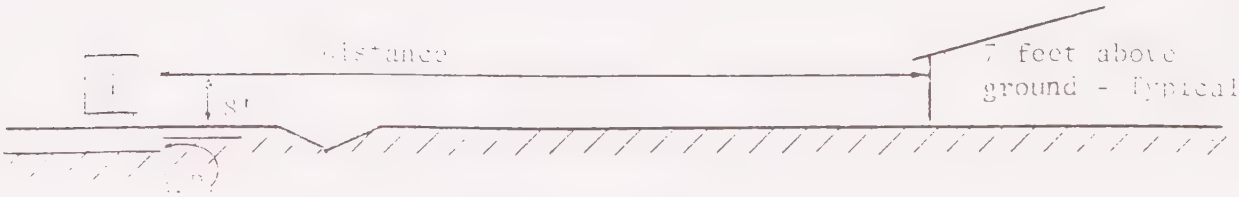
C. CALIFORNIA TEST METHOD NO. 701-A CHARTS



CITY STREET OR HIGHWAYS

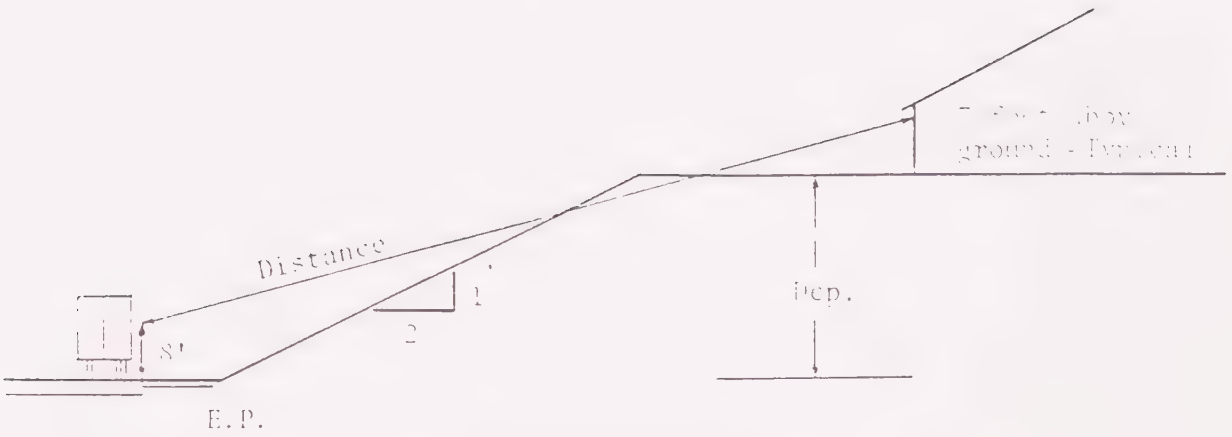
dBA							
80	75	70	65	60	55	50	45
100'	180'	320'	550'	1000'	1775'	3150'	5500'
Distance in feet from edge of pavement							

CORRECTIONS FOR VEHICLE TYPES AND SPEED (dBA)		
	Normal Highway Speeds	City Street or Highway 35 mph max.
[illegible]	0	-7
Diesel Trucks or Legally Muffled Motorcycles	-6	-13
No Trucks or Cross Country Buses	-10	-17



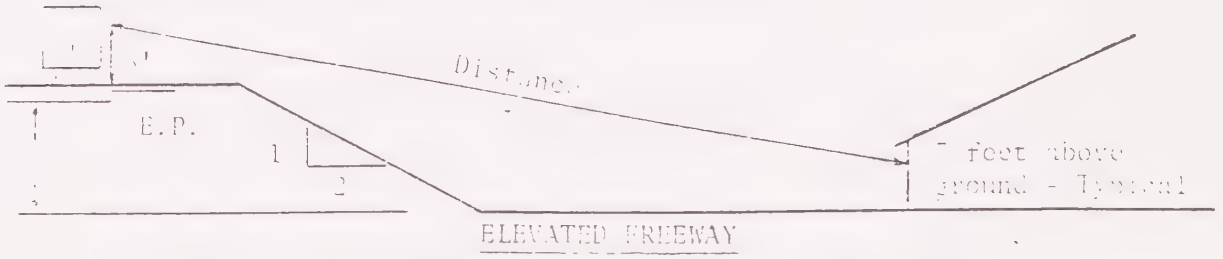
FREEWAY AT GRADE

dBA							
80	75	70	65	60	55	50	45
100'	180'	320'	560'	1000'	1775'	3150'	5500'
Distance in feet from edge of pavement.							



DEPRESSED FREEWAY

dBA*								
80	75	70	65	60	55	50	45	
80'	128'	228'	405'	720'	1275'	2275'	4000'	3' Dep.
75'	102'	165'	290'	520'	920'	1625'	2900'	10' Dep.
71'	90'	126'	210'	370'	660'	1175'	2100'	15' Dep.
68'	80'	102'	150'	265'	470'	850'	1500'	20' Dep.
Distance in feet from edge of pavement.								



ELEVATED FREEWAY

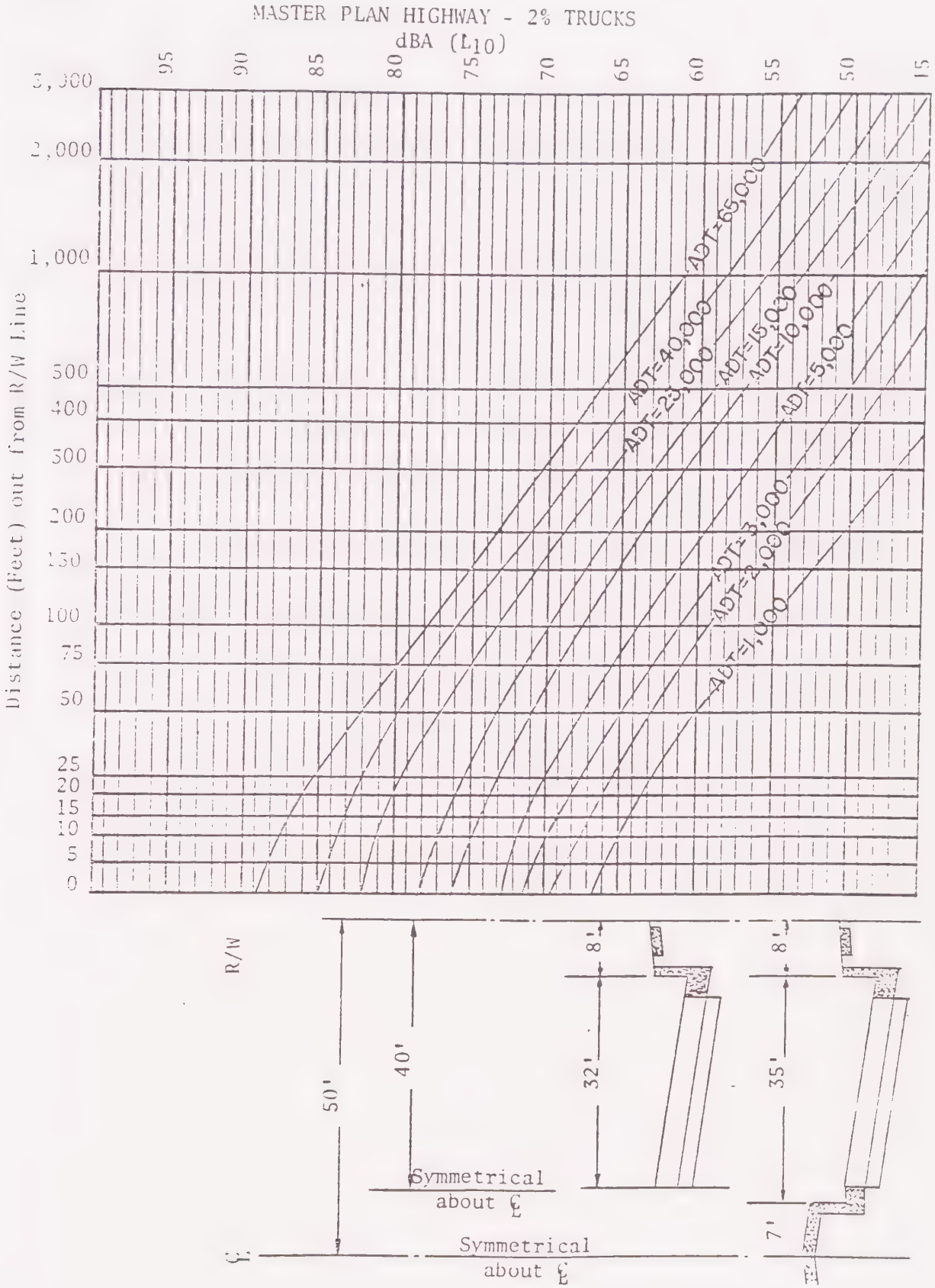
dBA*								
80	75	70	65	60	55	50	45	
78'	130'	265'	473'	840'	1500'	2650'	4750'	10' Elev.
--	120'	213'	390'	700'	1275'	2300'	4100'	20' Elev.
Distance in feet from edge of pavement.								

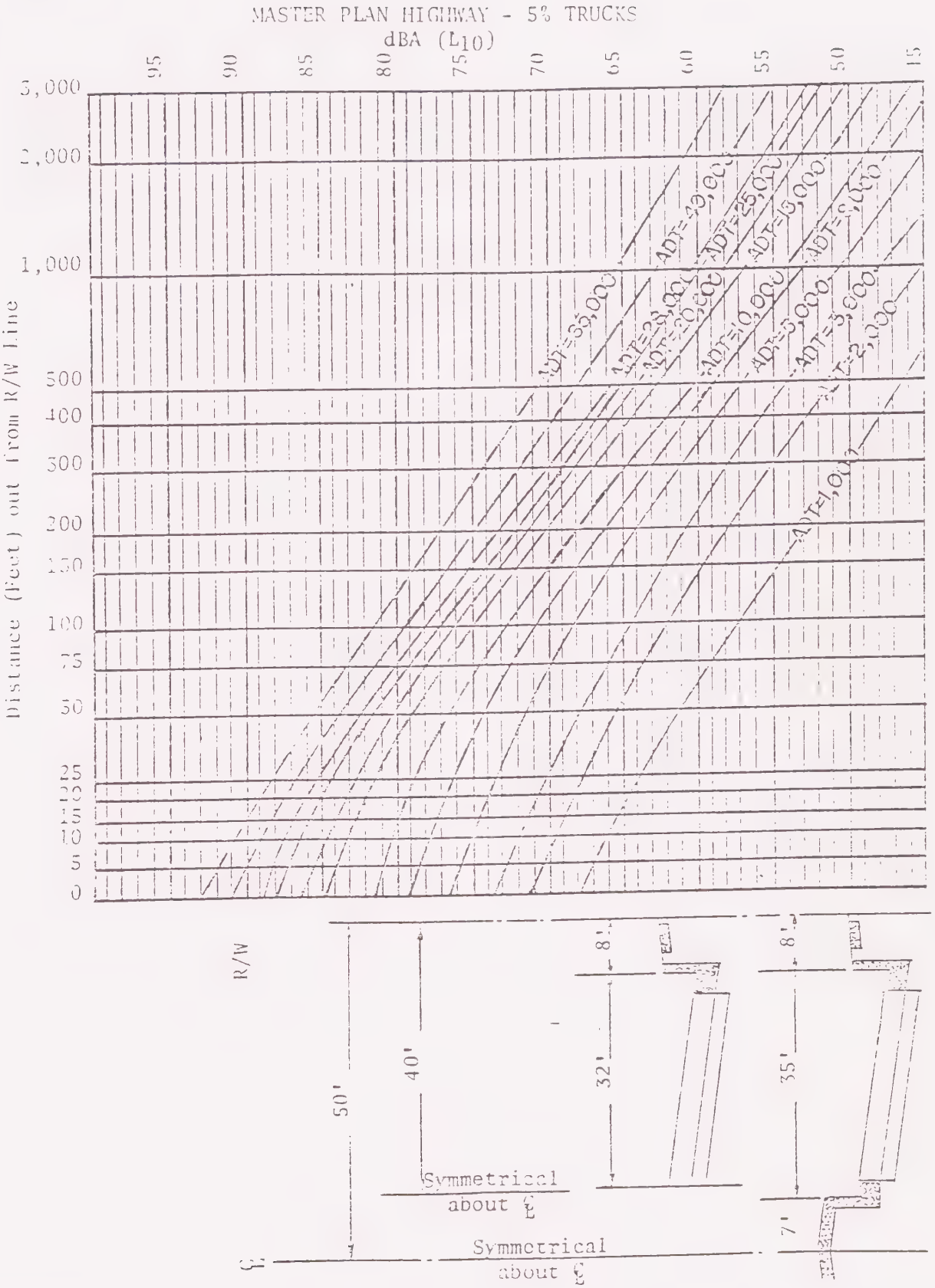
*Remarks: 1. Subtract 15 dBA if building is completely shielded from the view of the trucks.

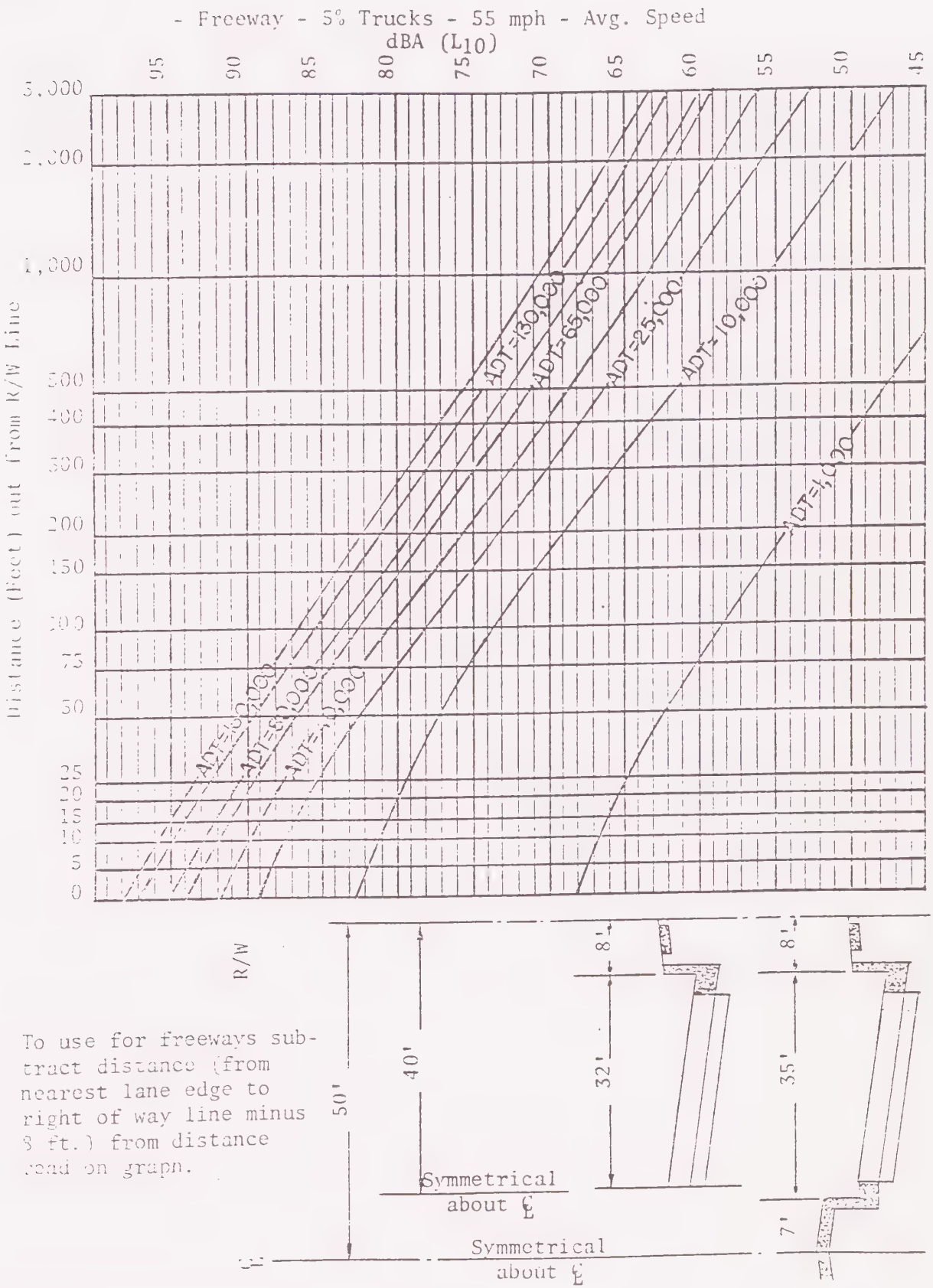
2. Subtract 5 to 7 dBA for partial shielding of residences from the view of the truck.

3. The range (+ 6 dBA) should always accompany results.

Ref.: Test Method No. [illegible] Dept. of Trans., Dist. [illegible]


MASTER PLAN HIGHWAY - 2% TRUCKS
dBA (L_{10})
95
90
85
80
75
70
65
60
55
50
15
3,000
2,000
1,000
500
400
300
200
150
100
75
50
25
20
15
10
5
0
Distance (Feet) out from R/W Line
ADT=65,000
ADT=40,000
ADT=30,000
ADT=15,000
ADT=10,000
ADT=5,000
ADT=3,000
ADT=2,000
ADT=1,000
R/W
50'
40'
8'
32'
8'
35'
Symmetrical about ℄
Symmetrical about ℄
7'


MASTER PLAN HIGHWAY - 5% TRUCKS
dBA (L_{10})
95
90
85
80
75
70
65
60
55
50
15
3,000
2,000
1,000
500
400
300
200
100
50
25
0
Distance (Feet) out From R/W Line
ADT=35,000
ADT=25,000
ADT=20,000
ADT=15,000
ADT=10,000
ADT=5,000
ADT=3,000
ADT=2,000
ADT=1,000
R/W
50'
40'
8'
32'
8'
35'
7'
Symmetrical about ℄
Symmetrical about ℄



To use for freeways subtract distance (from nearest lane edge to right of way line minus 8 ft.) from distance read on graph.

E. RAILROAD NOISE VS. DISTANCE CHART

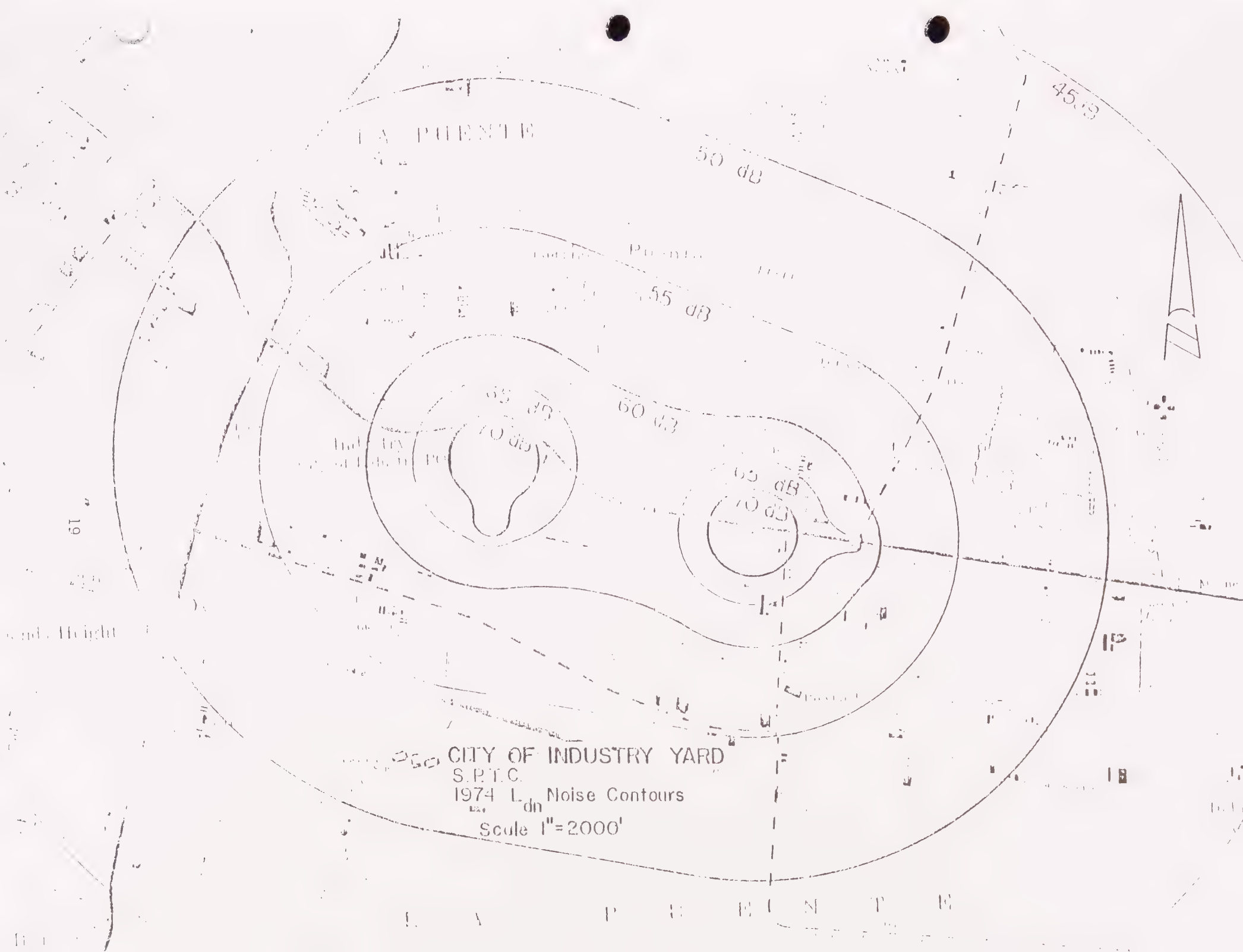
RAILROAD LINE OPERATION

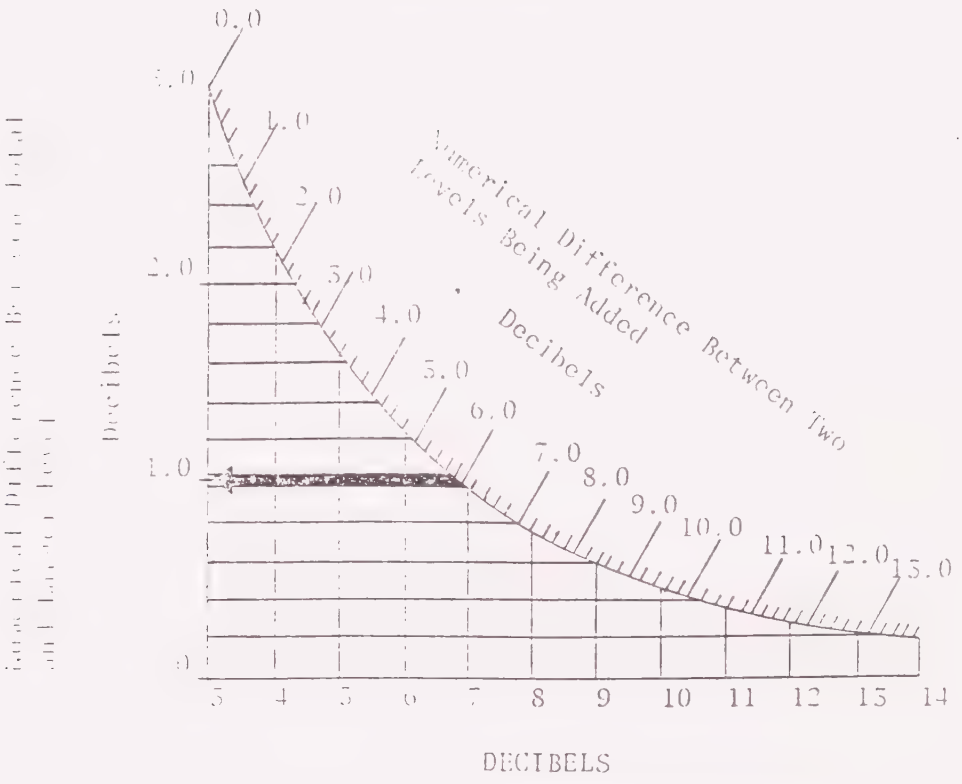
Distance (Feet) from ℄ Railroad Track

INSTRUCTIONS: (1) Determine N=Equivalent Number of Operations = 1 x no. of operations from 7:00 a.m. to 7:00 p.m. + 3 x no. of operations from 7:00 p.m. to 10:00 p.m. + 10 x no. of operations from 10:00 p.m. to 7:00 a.m. (shown on map), (2) Select a desired distance from the centerline of the railroad track and enter graph at this distance, (3) Move vertically to intersect the known N line, (4) Move horizontally to the right to determine the Community Noise Equivalent Level (CNEL), (5) From this value, add or subtract any correction factors to account for localized conditions which are different from or not included in the assumptions

ASSUMPTIONS: This graph assumes one diesel-electric locomotive pulling a train 2000 feet long at a speed of 30 mph on a straight mainline track on level terrain. There are no barriers or structures between the railroad and the observer.

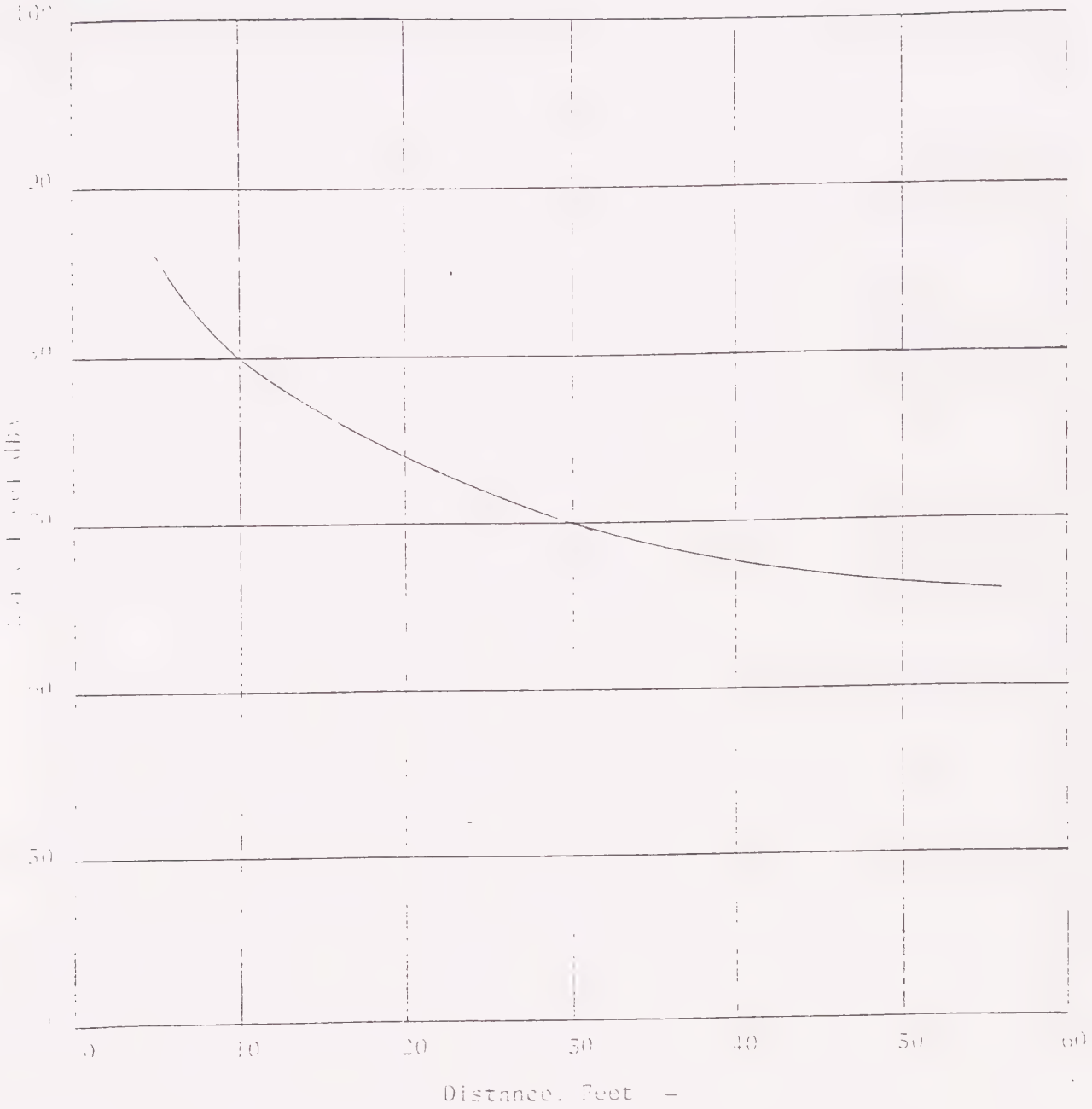
REFERENCE: Calculations based on: Swing, Jack W., and Donald B. Pies. Assessment of Noise Environment Around Railroad Operations. El Segundo, Calif.: Wyle Laboratories, July, 1973.


LA PUENTE
50 dB
55 dB
60 dB
65 dB
70 dB
65 dB
70 dB
45dB
CITY OF INDUSTRY YARD
S.P.T.C.
1974 L_{dn} Noise Contours
Scale 1"=2000'



NUMERICAL DIFFERENCE BETWEEN TOTAL AND SMALLER LEVEL

Because of its logarithmic nature, the decibel unit exhibits strange behavior. Adding 50 dBA to 50 dBA does not give 100 dBA; rather it gives 53 dBA. Doubling the sound power always causes the decibels to increase by 3. Two identical cars make 3 dB more sound than one car. Four identical cars make 6 dB more than one car, etc. When adding decibels where the two sound levels are not identical, use the chart above. The illustrated example shows that when the difference between the two sounds being added is 6 dB the total is only one decibel greater than the larger of the two levels (for example, 76 dB + 70 dB = 77 dB).

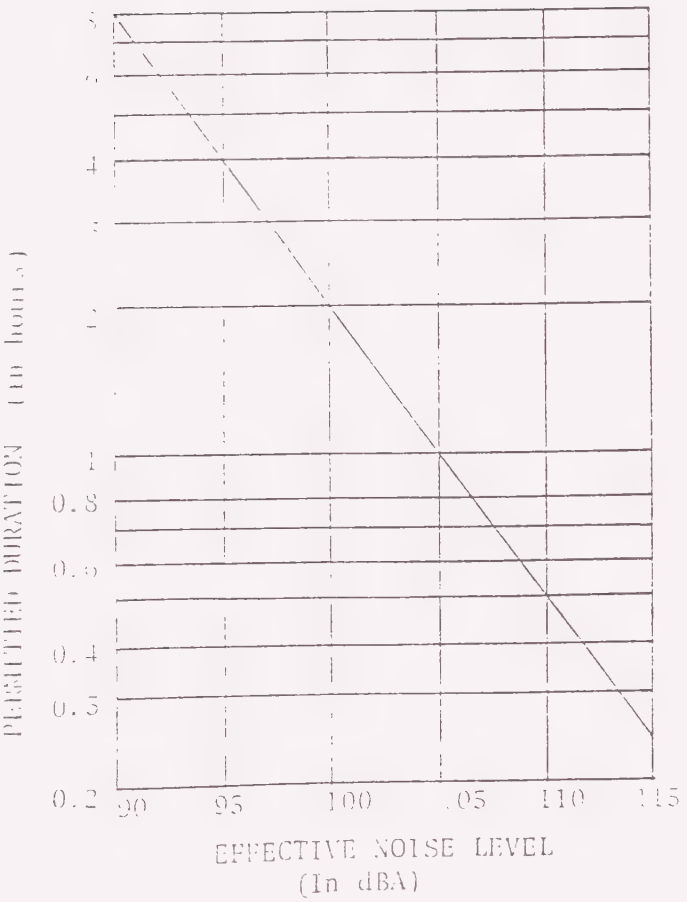


DECAY OF SOUND WITH DISTANCE

Sounds get quieter as the source gets farther away. The relationship of sound level to distance is strange, however. Every time the distance from the source is doubled, the sound level goes down 6 dB. The illustration demonstrates this principle.

The table and figure below both show the Federal Occupational Safety and Health Administration noise exposure limits (hours duration permitted for various sound levels) for people at work. Community noise problems are generally annoyance problems and not health problems.

OSHA NOISE EXPOSURE LIMITS



Duration Per Day (hours)	Sound level (dBA)
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

II. BASIS OF THE NOISE CONTOURS

Certain basic assumptions were made in determining Ldn values throughout the City. Because of the diversity of sources supplying information, not all noise readings were taken using the same techniques or corrections for time of occurrence. For the City of Industry, noise level data for transportation sources was presented by the Los Angeles County Road Department after assimilation from local traffic studies, Caltrans, and the railroad lines. The County provided L10 dBA readings for streets and highways based on traffic counts and the percentage of trucks in the traffic, CNEL dBA readings from the railroads lines based on number of operations, Ldn dBA readings from the City of Industry main line switch yard of the Southern Pacific Railroad, and maximum A-weighted diesel truck noise levels for Freeways by California Test Method 701-A.

In cases where most of the traffic is during daylight hours the CNEL and Ldn sound readings may be assumed equivalent. If Leq before weighting for night traffic equals that for day traffic, then the CNEL value exceeds the Ldn value by 0.5 dBA. If the Leq for night traffic is lower than for day traffic (a more realistic case) the difference between CNEL and Ldn values is reduced, approaching zero.

Similarly for a noise environment dominated by car and truck traffic noise the L10 level consistently exceeds the Leq level by 2 to 3.5 dBA. Since the Leq value is the basis of the Ldn and CNEL scales, as defined above, L10 values may be related to Ldn values. The relationship between L10 and Leq is: $Leq = L10 - 1.28\sigma - .115\sigma^2$. This equation assumes that traffic noise obeys a normal Gaussian distribution and σ is the standard deviation of the traffic noise. The normal range of values for σ is from 2 to 4 dBA.

For $\sigma = 2$, (L10 - Leq) = 2.10

$\sigma = 3$, (L10 - Leq) = 2.80

$\sigma = 4$, (L10 - Leq) = 3.28

Using the equation from above, it has been shown that L10 exceeds Leq by 2 to 3.5 dBA for normal conditions of traffic flow.

It can be shown that Ldn and CNEL values exceed the Leq value by 6.4 and 6.7 dBA respectively if the hourly night traffic volume equals the hourly volume of daytime traffic. If the noise level is down about 7 dBA at night, which indicates that the night traffic volume equals approximately 18% of the daytime volume, then the Ldn from this condition will be about 1.37 dBA greater than Leq for daylight traffic. See sample calculation to follow.

The relationship between Leq and Ldn is based on mean energy levels. The following equation expressed in intensities shows the relationship

$$Idn = \frac{\sum_{i=1}^{i=15} Ieqi + 10 \sum_{i=16}^{i=24} Ieqi}{24}$$

Ldn = Sound pressure level with day-night weighting of energy levels.

$Ldn = 10 \log\left(\frac{Idn}{10}\right)$ similarly, $Leq = 10 \log\left(\frac{Ieq}{10}\right)$

Idn = Intensity corresponding to sound pressure level = Ldn.

where $I_o = 10^{-16}$ watt/cm^2

I_o=Reference intensity, approx. equal to the faintest sound that humans can hear.

Two examples:

Case 1.) Daytime Leq = Nightime Leq = 65 dBA for each and every hour.

$\frac{Leq}{10} = \log^{-1}\left(\frac{Leq}{10}\right)$

Ieq = the intensity of sound for a pressure level equal to Leq.

$Ieq = I_o \log^{-1}\left(\frac{Leq}{10}\right)$

$Ieq = (1.10^{-16}) \log^{-1} (6.5)$

$Ieq = 10^{-16} \log^{-1} (.5) = 3.162 \times 10^{-10}$

$$Idn = \frac{15\ (3.162) \times 10^{-10} + (10)\ (9)\ (3.162) \times 10^{-10}}{24}$$

$$Idn = \frac{47.43 \times 10^{-10} + 284.580 \times 10^{-10}}{24} = \frac{332.01 \times 10^{-10}}{24} = 13.835 \times 10^{-10}$$

$$Ldn = 10 \log \frac{13.835 \times 10^{-10}}{10^{-16}} = 10 \log 1.3833 \times 10^{7} = 10\ (7.141) =$$

Ldn = 71.41 $\quad \Delta$=6.41

to 65 dBA = Leq

Thus we see, that for Leq for each hour of the day, Ldn is 6.4 dBA greater than Leq.

Case 2.) Daytime Leq = Constant for each day hour = 61 dBA

Nighttime Leq = Constant for each night hour = 54 dBA

$I_{eqd} = 10^{-16} \log^{-1} (6.1) = 10^{-10} \log (0.1) = 1.26 \times 10^{-10}$

$I_{eqn} = 10^{-16} \log^{-1} (5.4) = 10^{-11} \log (0.4) = 2.51 \times 10^{-11}$

$$I_{dn} = \sum_{i=1}^{i=15} (1.26 \times 10^{-10}) i + 10 \sum_{i=16}^{i=24} (2.51 \times 10^{-11})$$

$I_{dn} = (1.26 \times 10^{-10}) (15) - (9) (10) (2.51) \times 10^{-11}$

$I_{dn} = 18.9 \times 10^{-10} + 22.59 \times 10^{-10} = \frac{41.49 \times 10^{-10}}{24}$

$I_{dn} = 1.72875 \times 10^{-10}$

$$L_{dn} = 10 \log \left(\frac{I_{dn}}{I_o}\right) = 10 \log \left(\frac{1.72875 \times 10^{-10}}{10^{-16}}\right)$$

$= 10 \log (1.72875 \times 10^{6}$

$= 10 (6.237) = 62.37$

$L_{dn} = 62.37$

$\Delta = 1.37$ To 61 dBA = daytime Leq

Both of these cases may be checked at other values but as long as Leq is constant for the entire 24 hour period Ldn will be 6.4 dBA higher than ... As long as there is a constant day Leq and constant night Leq - dBA less than the day Leq then the resultant Ldn will be about 1.37 dBA greater than the daytime Leq.

Therefore, it may be said that

(1) Leq = L10 - (Value in the range (1)) (dBA) Mid range σ = 3.0 = Standard Deviation yields a typical value (2.80) for Range 1 to be subtracted from L10.
2.0 to 3.5

(2) Ldn = Leq - Value in the Range (2) dBA Typical value (1.3) for Range (2 to be added to Leq when night time traffic = 15% of daytime traffic.
3 to 6.1

Substituting into equation (2) from equation (1) we obtain:

Ldn = (L10 - Range (1)) + Range (2)

Substituting in the typical values for the ranges

Ldn = L10 - 2.80 + 1.40 = L10 - 1.40

So L10 exceeds Ldn by 1.40 for typical values.

1.4 dBA is not a perceptible noise change to the human ear. The human ear cannot discern noise levels until approximately a 3 dBA change has occurred.

Although they could be somewhat high it has been assumed that County L10 numbers are equivalent to Ldn readings.

These noise levels are presented in figure (1) as contours of equal value in 5 dBA increments.

Figure (2) shows the readings taken by city staff during preparation of this element. An ambient and peak noise level were recorded at the location and time shown. The ambient reading is generally below the contour reading and the peak reading exceeds the contour as would be expected. The readings were made at random in an attempt to cover the entire city and to discover any industries which might be generating excessive noise.

Peak and ambient noise levels have been determined for the various sites using the following measurement techniques.

a. Sound Level Meter

Tracoustics model SLM S2A which meets the requirements of the ANSI S 1.4 - 1971 Standards for a Class 2, Special Purpose Sound Level Meter ("A" scale only). The meter was calibrated (compatible with ANSI level 2 calibration requirements) "using a Tracoustics Model SLM-C Sound Level Calibrator".

b. Method

All measurements were taken by pointing the microphone at the nearest point of sound source on location, based on the fact that noise source in open areas is essentially directional, and not random, (as experienced in enclosed environments). The meter was held out from the body to avoid interference or reflections and was held horizontally approximately four (4) feet from the ground.

c. Scale

All measurements were taken on dBA "Slow" scale.

a. Type of Noise

All noise measured was "continuous" in nature, i.e., duration of all noise was in excess of one second, as opposed to "impact" noise (Ref. ANSI Standards). No purely impact type of noise was observed. Noise level measurements were taken at various locations throughout the city as shown on (Figure 2).

LOG OF NOISE READINGS

	LOCATION	DATE	TIME	AMBIENT (dBA, Slow)	PEAK (dBA, Slow)
1	Valley Blvd. & Grand Avenue	7-29-74 9-17-74	10:45 A.M. 8:00 P.M.	50 60	65 78
2	Brea Canyon Road & Old Ranch Road	7-29-74 9-17-74	10:50 A.M. 7:54 P.M.	50 48	65 --
3	Brea Canyon Road & Currier Road	7-29-74 9-17-74	10:52 A.M. 7:50 P.M.	45 54	64 76
4	Currier Road & Lemon Avenue	7-29-74 9-17-74	10:55 A.M. 7:46 P.M.	45 52	55 --
5	Walnut Drive 1000' & O Lemon Avenue	7-29-74 9-17-74	11:00 A.M. 7:44 P.M.	50 62	72 72
6	Valley Blvd. & Bourdett Avenue (South Side)	7-29-74 9-17-74	10:40 A.M. 8:06 P.M.	-- 50	65 75
7	Fairway Drive Just S O S.P.A.A.	7-29-74 9-17-74	10:55 A.M. 8:10 P.M.	48 55	80 78
8	Fairway Drive & Roelle Road	7-29-74 9-17-74	10:51 A.M. 7:40 P.M.	56 62	78 67
9	Centre Drive Cul de Sac near Brea Canyon Cut Off	7-29-74 9-17-74	10:28 A.M. 7:36 P.M.	55 50	62 72
10	Nogales Street & 200' South of Valley Blvd.	7-24-74 9-17-74	11:04 A.M. 8:05 P.M.	55 51	77 78
11	Nogales Street & (Old) Railroad Street	7-24-74 9-17-74	11:02 A.M. 7:29 P.M.	50 60	64 74
12	Railroad Street & Charlie Road	7-24-74 9-17-74	10:58 A.M. 7:26 P.M.	52 58	69 --
13	Arenth Avenue (Opp. Ternes Steel Co.)	7-24-74 9-17-74	11:08 A.M. 8:07 P.M.	45 45	-- --
14	Arenth Avenue & Lawson Street (Extended)	7-24-74 9-17-74	11:10 A.M. 8:10 P.M.	48 49	73 --

	LOCATION	DATE	TIME	AMBIENT (dBA, Slow)	PEAK (dBA, Slow)
15	Railroad Street & Fullerton Road	7-24-74	10:52 A.M.	58	70
		9-17-74	7:25 P.M.	62	--
16	Fullerton Road 150' S/O Pomona Freeway	7-24-74	10:48 A.M.	52	82
		9-17-74	7:20 P.M.	60	77
17	Albatros St. between Freeway & Colima Rd.	7-24-74	10:42 A.M.	48	--
		9-17-74	7:14 P.M.	50	--
18	Puente Hills Mall 200' E/O Azusa Ave.	7-24-74	10:37 A.M.	50	64
		8-27-74	8:12 P.M.	58	72
19	Chestnut Street & Hatcher Avenue	7-24-74	11:18 A.M.	48	--
		8-27-74	8:00 P.M.	55	--
20	Chestnut Street & Azusa Avenue	7-22-74	11:10 A.M.	50	76
		8-27-74	7:55 P.M.	53	70
21	Azusa Avenue & Railroad Street	7-22-74	11:12 A.M.	64	85
		8-27-74	8:07 P.M.	65	81
22	Green Drive N. E. Corner	7-22-74	11:15 A.M.	52	80
		9-17-74	7:08 P.M.	59	--
23	Johnson Drive & Bixby Drive	7-22-74	11:05 A.M.	50	--
		8-27-74	7:47 P.M.	62	--
24	Gale Avenue & Johnson Drive	7-22-74	11:00 A.M.	50	--
		8-27-74	7:45 P.M.	56	69
25	Bixby Drive & Chestnut Drive	7-22-74	11:07 A.M.	50	75
		8-27-74	7:49 P.M.	51	--
26	Stimson Avenue at Robin Way	7-22-74	10:58 A.M.	50	67
		8-27-74	7:42 P.M.	55	64
27	Stephens Street East End	7-22-74	10:55 A.M.	52	--
		9-17-74	6:47 P.M.	49	--
28	Valley Blvd. & Stimson Avenue - S.E. Corner	7-22-74	10:50 A.M.	62	68
		9-17-74	6:50 P.M.	59	80
29	Old Valley Blvd. at New Valley Blvd. Over-Pass.	7-17-74	4:00 P.M.	67	85
		9-17-74	7:05 P.M.	62	70

	LOCATION	DATE	TIME	AMBIENT (dBA, Slow)	PEAK (dBA, Slow)
30	Old Valley Blvd. Along Switch Yard	7-17-74 9-17-74	4:05 P.M. 7:10 P.M.	55 72	74 --
31	In Switch Yd. at Intersection of Old Valley & New Valley (100' in)	7-17-74 9-17-74	4:10 P.M. 7:05 P.M.	55 62	62 74
32	Corner Old Valley Blvd. & Stimson Ave.	7-17-74 9-17-74	3:55 P.M. 6:53 P.M.	55 50	70 68
33	New Valley Blvd. between Stimson Ave. & Hacienda Blvd. (North side)	7-17-74 9-17-74	4:25 P.M. 8:20 P.M.	55 50	70 75
34	Hacienda Blvd. (New) & Valley Blvd. (N.E. corner)	7-17-74 9-17-74	4:30 P.M. 6:44 P.M.	65 63	95 76
35	Corner of Old Valley Blvd. & Glendora Ave.	7-17-74 9-05-74	3:52 P.M. 7:17 P.M.	55 52	70 75
36	Corner of Abbey St. & Glendora Avenue	7-17-74 9-05-74	3:50 P.M. 7:44 P.M.	55 55	65 72
37	Corner of Workman St. & Ridgeway Street	7-17-74 9-05-74	3:47 P.M. 7:40 P.M.	50 48	58 --
38	Abbey St. between Hacienda Blvd. & Ridgeway Street	7-17-74 9-05-74	3:45 P.M. 7:39 P.M.	55 54	-- 76
39	Hudson St. & Abbey St. (Nat'l. Engineering Co. parking lot)	7-12-74 9-05-74	9:50 A.M. 7:33 P.M.	55 52	-- --
40	100' North of edge of Valley Blvd. opposite Proctor Avenue	7-18-74 9-05-74	9:15 A.M. 7:56 P.M.	50 58	65 73
41	Valley Blvd. at Proctor Ave. N/S.	7-18-74 9-05-74	9:20 A.M. 7:54 P.M.	60 52	89 76
42	Proctor Ave. & El Encanto Road	7-18-74 9-05-74	9:25 A.M. 8:00 P.M.	50 53	69 68

	LOCATION	DATE	TIME	AMBIENT (dBA, Slow)	PEAK (dBA, Fast)
43	El Encanto Road & Private Drive	7-18-74	9:30 A.M.	45	50
		9-05-74	8:02 P.M.	47	--
44	El Encanto Grounds at Swimming Pool	7-18-74	9:30 A.M.	45	55
		9-17-74	6:38 P.M.	46	--
45	South of El Encanto Grounds (in Field South)	7-18-74	9:32 A.M.	45	--
		9-17-74	6:30 P.M.	47	58
46	El Encanto Grounds West end of Bldgs.	7-18-74	9:35 A.M.	50	--
		9-17-74	6:41 P.M.	52	--
47	Turnbull Canyon Rd. & Don Julian Rd.	7-18-74	9:45 A.M.	50	68
		8-27-74	7:51 P.M.	57	70
48	Proctor Avenue & Turnbull Canyon Rd.	7-18-74	9:40 A.M.	55	90
		8-27-74	7:29 P.M.	50	77
49	Turnbull Canyon Rd. - 100' East & 400' South of Valley Boulevard	7-22-74	10:40 A.M.	65	--
		9-17-74	6:55 P.M.	61	72
50	Nelson Avenue E/O Unruh Ave. 500' ±	7-12-74	9:55 A.M.	56	65
		9-17-74	8:50 P.M.	54	78
51	Salt Lake Ave. at Turnbull Canyon Road	7-18-74	9:47 A.M.	55	64
		9-17-74	6:53 P.M.	55	70
52	Between Salt Lake Ave. & Parriott Place	7-18-74	9:50 A.M.	61	--
		9-17-74	6:56 P.M.	56	77
53	Salt Lake Avenue & Parriott Place	7-18-74	9:55 A.M.	50	78
		9-17-74	7:00 P.M.	57	76
54	Proctor Avenue & Railroad Tracks	7-31-74	11:14 A.M.	50	--
		8-27-74	7:25 P.M.	55	72
55	Proctor Avenue & 6th Avenue	7-31-74	11:10 A.M.	58	70
		8-27-74	7:22 P.M.	55	68
56	Proctor Avenue & 4th Avenue	7-31-74	11:07 A.M.	45	50
		8-27-74	7:17 P.M.	48	78
57	Workman Mill at Cole Ford (C.C.C. Entrance)	7-17-74	9:15 A.M.	60	66
		8-27-74	7:08 P.M.	60	73

	LOCATION	DATE	TIME	AMBIENT (dBA, Slow)	PEAK (dBA, Slow)
58	California Country Club Parking Lot	7-17-74 8-27-74	9:20 A.M. 7:06 P.M.	50 58	-- --
59	Workman Mill Road & Pellissier Place	7-19-74 9-03-74	10:12 A.M. 7:52 P.M.	67 65	78 77
60	Pellissier Place & Peck Road	7-19-74 9-03-74	10:50 A.M. 8:10 P.M.	55 56	80 66
61	Mission Mill Road & Capitol Avenue	7-19-74 9-03-74	10:30 A.M. 8:07 P.M.	54 55	78 --
62	Capitol Avenue (North end) (Cul de Sac)	7-19-74 9-03-74	10:35 A.M. 8:05 P.M.	55 58	60 65
63	Rose Hills Road W/O U.P.R.R. 300'	7-19-74 9-03-74	10:40 A.M. 8:00 P.M.	50 57	67 --
64	Rose Hills Road on Shepherd Property	7-19-74 9-03-74	10:45 A.M. 7:58 P.M.	55 60	80 --
65	Valley Blvd. & Rumford Avenue	7-31-74 9-05-74	11:00 A.M. 7:02 P.M.	55 56	80 82
66	Temple Avenue & Perez Place	7-31-74 9-03-74	10:52 A.M. 8:40 P.M.	57 61	78 --
67	Temple Ave. W/O Baldwin Park Blvd. at 90 Turn	7-31-74 9-03-74	10:45 A.M. 8:37 P.M.	57 57	70 64
68	Louden Lane 200' W/O Baldwin Park Blvd.	7-31-74 9-03-74	10:42 A.M. 8:26 P.M.	50 60.5	60 --
69	Amar Road & Baldwin Park Blvd.	7-31-74 9-03-74	10:37 A.M. 8:30 P.M.	55 60	67 64
70	Amar Road & Canal Place	7-31-74 9-03-74	10:33 A.M. 8:35 P.M.	57 57	83 69
71	Vineland Ave. & Ector St. (500' West)	7-31-74 9-03-74	10:26 A.M. 8:35 P.M.	52 58	57 --
72	Baldwin Park Blvd. & Railroad Avenue	7-31-74 9-03-74	10:54 A.M. 8:22 P.M.	58 58	75 86

Noise Contour Map
of
City of Industry